

PATENT SPECIFICATION

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(54) IMPROVEMENTS IN OR RELATING TO A FRAME FOR A SKYLIGHT

(71) I, PIERRE EMMANUEL EUGENE JEAN BOGAERT, of 18, Dijk at Wemmel, Belgium, a Belgian Subject, do hereby declare the invention, for which I pray that a patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The present invention relates to a frame for the fixing of a skylight on a roof, particularly a flat roof, which frame is a one-piece moulding produced, for example, by injection moulding or by extrusion, from a material which can be easily machined.

Up to the present time, standard skylight supporting frames have been produced which could not be used directly to support a skylight, that is to say, these frames were used exclusively for receiving various means interposed between the frame and the skylight, only the said means (and not the frame itself) being variable to permit various ways of using the skylight; consequently, in the past, it has been necessary to provide an entire series of accessories for receiving the skylight, these accessories varying depending on whether the skylight is to be fixed non-adjustably to the base, or is to be secured so as to be capable of opening. It was also necessary to provide means for discharging water caused by condensation.

According to one aspect of the invention there is provided a frame for fixing a skylight on a roof, which frame is a one-piece moulding or extrudate of machinable material (for example, a one-piece moulding of high density polyurethane foam with an integral skin) and has an interior to be covered by the skylight and an exterior, and which frame has a profiled portion providing the upper surfaces of the frame, which profiled portion has, on formation thereof by said moulding or extrusion, at least one inwardly open groove which may receive the rim of a skylight sheet, and a collecting recess adjacent to the said inwardly open end of the groove for collecting water caused by condensation, and orifices

communicating with the recess and extending to the exterior of the frame for discharging water from the collecting recess to the said exterior of the frame.

The said groove of the profiled portion of the frame can, on formation of the frame by the said moulding or extrusion, be a continuous groove extending around the interior of the frame, the groove having an upper face provided by a flange terminating at a free end thereof at the open end of the groove, a lower face provided by a ledge for supporting a skylight sheet and a base of the groove provided by an upstanding rib between the flange and the ledge.

Since a frame of the present invention is made of a material which can easily be machined, parts of the frame can be cut away by machining to enable the insertion of a skylight sheet in the groove, or alternatively, the skylight may be merely secured to the top of the frame (optionally after cutting away the upper portion of the frame defining the upper face of the groove). The level at which the basic profile is cut (ie. the amount of the said profiled portion to be removed) is determined by the manner in which the frame is to be used.

Particular methods of the invention for fitting a skylight on a roof will now be described with reference to the accompanying drawings, simply by way of example, wherein:—

Fig. 1 shows a view in section and in perspective of the profiled portion of a frame embodying the invention,

Fig. 2 shows in sectional elevation one possible way of using the frame of Fig. 1 when the profiled portion is cut along the line II—II of Fig. 1.

Fig. 3 shows another way of using the frame of Fig. 1 when the profiled portion is cut along the line III—III of Fig. 1.

Figs. 4a and 4b show in sectional elevation the profiled portion of the frame of Fig. 1 the frame having been cut on the line IV—IV.

Fig. 5 shows in perspective and partly in

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section a way of using a frame of Fig. 1, the profiled portion of which has been cut along the line III—III of Fig. 1, but only along one side of the frame.

5 Fig. 6 shows in sectional elevation another possible way of using the frame of Fig. 1.

Fig. 7 shows a view in section and in perspective of a second embodiment of frame within the invention,

10 Fig. 8 shows one possible way of using the frame of Fig. 7 when the profiled portion is cut along the line VIII—VIII of Fig. 7,

15 Fig. 9 shows in sectional elevation a part of the frame when the profiled portion of the frame shown in Fig. 7 has been cut along the line IX—IX of Fig. 7,

Fig. 10 shows in perspective and in section a third embodiment of a frame within the invention and

20 Fig. 11 shows one possible way of using the frame of Fig. 10.

In the following description all the profiles described are parts of a frame for a roof aperture which frame is a one piece moulding.

25 Referring now to the drawings and more especially to Figs. 1 to 6, a roof aperture frame for a skylight is produced by moulding (e.g. injection moulding) or extrusion and is made of a material which can easily be machined. The frame has at its upper region a profiled portion 1 including a horizontal groove 2 the upper face of which is provided by a flange 3 and which groove 2 is adjacent to a channel 4 used as a collecting recess for water caused by condensation, and orifices 5 connecting the channel 4 to the exterior of the frame, these orifices 5 being downwardly inclined towards the exterior to ensure that water collected in the channel 4 will be discharged.

30 Referring more especially to Fig. 2, this shows how the profiled portion of the frame of Fig. 1, can be used after being modified, ie after it has been cut horizontally along the line II—II of Fig. 1, that is to say, the ledge 3 is removed, and a skylight sheet 6 is placed on a ledge 7 provided by the lower face of the groove 2 so that an upstanding rib 8 having two faces 9, 10 (respectively providing the base of the groove 2 and a part of the external face of the frame) surrounds the skylight 6. The face 9 of the upstanding rib 8 and skylight 6 (although not as illustrated in Fig. 2) can abut one another.

35 When the profiled portion 1 is used in this way the cut II—II is made around the entire periphery of the frame and the skylight 6 is then introduced into the space bounded by the rib 8 around the periphery of the profiled portion 1, so that the skylight 6 rests on the ledge 7; the skylight 6 is then rendered fast with the said frame, for example by means of a batten 11 bearing on an edge

12 of the skylight, which batten 11 is adhered to the skylight 6 by means of a sealing element 13 and secured to the rib 8. This batten can be a continuous flange extending around the entire periphery of the skylight or can be simply provided locally at various points on the periphery. It is possible, for example, to use as the fixing batten 11 a length of scrap obtained by making the aforesaid cut on the line II—II, that is to say using the previously cut-away flange 3.

70 It will also be noted that in the constructional form shown in Fig. 2 there is arranged in the orifices 5 a water-pervious sealing element 14 for providing a seal against rain, wind and dust whilst permitting the outflow of condensed water towards the exterior.

75 Referring now to Fig. 3, this shows how a profiled portion of Fig. 1 can be used after being modified ie, after a horizontal cut has been made on the line III—III. The cut is thus made in the horizontal plane of the ledge 7 which before cutting provided the lower face of the groove 2. For securing the skylight 6 to the remaining part of profiled portion 1 a piece of scrap consisting of the previously cut-away rib 8 and flange 3, is utilised, this piece after fitting, defining a frame which, of course, can be positioned very accurately on the top of the skylight frame since it is a matching piece. In the method of use shown in Fig. 3, a mastic 13' is placed between the flange 3 and the edge 12 of the skylight 6.

80 Fig. 5 shows a skylight frame wherein the skylight 6 is again fixed by cutting at the level III—III of Fig. 1, this time not over the entire periphery of the frame but only over one side 15 as shown by the broken line 16. In this way there is obtained a cut which opens up the groove at each longitudinal end of opposite sides 15', 15'' of the frame so as to enable the skylight 6 to be introduced in the direction indicated by the arrow 17, by sliding it along the grooves in the sides 15', 15'' of the frame until it abuts in the groove at end 15''.

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Fig. 5 shows a skylight frame wherein the skylight 6 is again fixed by cutting at the level III—III of Fig. 1, this time not over the entire periphery of the frame but only over one side 15 as shown by the broken line 16. In this way there is obtained a cut which opens up the groove at each longitudinal end of opposite sides 15', 15'' of the frame so as to enable the skylight 6 to be introduced in the direction indicated by the arrow 17, by sliding it along the grooves in the sides 15', 15'' of the frame until it abuts in the groove at end 15''.

The cut-away part of the side 15 is then replaced, and is fixed, for example, in the same way as that described in relation to Fig. 3. In this way a particularly easy and rapid fixing of the skylight on the frame is possible, requiring only a minimum amount of labour and fixing means.

Figs. 4a and 4b each show a frame having the same profiled portion as that of the frame of Fig. 1 wherein a cut has been made along the line IV—IV so as to permit the fitting of a skylight in such a way that it can be opened, by providing, between an upper portion 18 of the frame situated above the cut made along the line IV—IV (which defines a movable casing) and a lower

- portion 19 thereof below the cut IV—IV, (which defines a fixed casing) means for displacing the movable casing away from the fixed casing.
- 5 In the constructional form shown in Fig. 4a, reinforcement elements 20, 20' are inserted between the upper portion 18 and the lower portion 19 of the frame, which elements 20, 20' are right-angled Z shaped elements to which a pivotable connection, for example, a hinge 21 is fitted to allow opening of the skylight by moving upper portion 18 of the frame.
- 10 In the constructional form shown in Fig. 4b reinforcement elements 22—22' are inserted between the upper portion 18 and lower portion 19 of the frame, which elements are U-shaped elements, hinge parts being fixed to one pair of adjacent legs of each U at one face of the frame and, at the opposite face, means 23 for spacing the upper and lower portions 18 and 19 respectively apart from one another to open the skylight.
- 15 When the skylight is small in size it is, however, possible to use the frame without any reinforcement element, the external face of the profiled portion being used for fixing hinge parts thereto and the internal face for fixing opening handles, once the cut has been made along the line IV—IV.
- 20 As regards the fixing of the skylight to a frame of Fig. 4a or Fig. 4b, only one of the methods of use previously described in relation to Figs. 2 or 3 can be used.
- 25 As illustrated in Fig. 4b the frame can of course be used for fixing a double skylight 6—6'.
- 30 Fig. 6 shows a further method of fitting a skylight to the profiled portion of the frame of Fig. 1. By this method, the skylight is merely placed directly on upper face 24 of the frame; in Fig. 4 a particular skylight is shown which has wide passages 25 caused by deformation of the edge of the skylight to permit constant ventilation of the room below.
- 35 Referring now to the constructional form of profiled portion of a frame as shown in Fig. 7, the profiled portion 1 has a groove 2 with an upper face provided by a flange 3, a lower face provided by a ledge 7 and a base provided by an upstanding rib therebetween. Adjacent to the groove 2 is a channel 4 having a base downwardly inclined toward the exterior of the frame. Orifices 5 having a base coplanar with the downwardly inclined base of channel 4 open into a side wall of channel 4 and extend to external face 10 of the frame and thus serve to communicate channel 4 with the exterior of the frame. Orifices 5 open into and run underneath groove 2.
- 40 Fig. 8 shows how a profile portion of Fig. 7 can be used after being modified, ie after a cut has been made on the line VIII—VIII of Fig. 7, that is to say at the level of the ledge 7 which, before cutting, provided the lower face of the groove 2.
- 45 In the constructional form illustrated, the skylight edge 12 rests on a sealing element 26, which is rigid but has open pores, which sealing element 26 in turn rests on the base 27 of the channel 4. The skylight edge 12 is surrounded by side wall 28 of the channel 4 (which side wall 28 can, although not shown in the drawing, abut the skylight edge 12), while a batten 11 rests on the cut formed at the level of the ledge 7.
- 50 Fig. 9 shows how the profiled portion of the frame of Fig. 7, can be used after being modified, ie after a cut has been made on the line IX—IX of Fig. 7. In this method of use, the skylight 6 again rests on a sealing element 26 which in turn rests on the base 27 of the channel 4 the skylight 6 being surrounded by side wall 28 of channel 4, while a batten 11 is placed on the ledge 7 and is surrounded by (and may abut) rib 8 remaining from the cut.
- 55 It will also be noted (as illustrated in Fig. 9) that it is possible to provide a slot in the foot of the frame (since this is a frame produced by moulding) for the insertion therein of a sheet 29 made for example of aluminium from a roof to thereby fix the frame to the roof.
- 60 Fig. 10 shows a third constructional form of the profiled portion of a frame which has a groove 2 with an upper face provided by a flange 3, which groove 2 opens into an adjacent channel 4, the groove 2 having a lower face provided by a ledge 7, which ledge 7 also provides the base 27 of the channel 4. Orifices 5 are provided which are inclined downwardly from the interior to the exterior of the frame. The orifices 5 are defined by recesses in ledge 7 which run from the innermost wall of channel 4 across the base 27 thereof, across the lower face of groove 2 and down to the exterior of the frame, so communicating channel 4 with the exterior of the frame.
- 65 Fig. 11 shows one way of using a profiled portion of a frame of Fig. 10 wherein a skylight 6 is clamped between the flange 3 and a deformable open-pore sealing element 30, the said sealing element 30 being crushed between on the one hand the ledge 7 (providing base 27 of the channel 4 and the lower face of the groove 2) and on the other hand an edge 12 of the skylight. The sealing element 30 is thus deformed so as to be urged into the orifices 5. The sealing element 30 remains sufficiently pervious to permit the passage of water caused by condensation through it whilst providing a seal against rain, wind and dust.
- 70 As previously stated, the various constructional forms of frame are made by

	moulding (e.g. injection moulding) or extruding from a material which can easily be machined, and preferably a polyurethane foam of high density with an integrated skin	65
5	is used; this is in fact a material which is strong but very easily machined, so as to permit cutting either in the factory or directly at the building site.	
10	It will be noted, with particular reference to Figure 1, that it is possible to include notches 31-31' in the frame to indicate preferred levels of cutting, which notches can be provided at the periphery of the frame and make it possible for cutting to be carried out without having to measure the draw lines on the frame.	
15	Also, complete assembly of the skylight with the frame in the workshop is more and more in demand, and it is possible to form a bevel 32 on the top of the frame to permit a plurality of entirely assembled units to be stacked on one another.	
20	It will also be noted that in the various constructional forms shown there has been provided on the external face 10 at the bottom of the vertical portion a recess 33 with a view to receiving, when the frame is in position, a roofing sheet 34 as illustrated for example in Fig. 5.	
25	From the above-description of embodiments of the invention it can be seen that the invention provides a basic frame which may be used in various methods of fixing a skylight depending on the position at which a cut is made through the basic frame. It is thus an "all-purpose" frame usable in a simple manner in various possible ways. By simple machining in the form of cuts, usually horizontal, the frame	
30	can be modified in the production works or at the building site to suit a particular need. This avoids the need for having various moulds to produce frames for each method of use.	
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45	WHAT I CLAIM IS:—	
50	1. A frame for fixing a skylight on a roof, which frame is a one-piece moulding or extrudate of machinable material and has an interior to be covered by the skylight and an exterior, and which frame has a profiled portion providing the upper surface of the frame, which profiled portion has on formation thereof by said moulding or extrusion, at least one inwardly open groove which may receive the rim of a skylight sheet, and a collecting recess adjacent to the said inwardly open end of the groove for collecting water caused by condensation, and orifices communicating with the recess and extending to the exterior of the frame for discharging water from the collecting recess to the said exterior of the frame.	
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60	2. A frame according to claim 1 wherein the said one-piece moulding is of high-	
	density polyurethane foam with an integral skin.	
	3. A frame according to any one of the preceding claims wherein the collecting recess is a channel having a horizontal base.	70
	4. A frame according to claim 1 or claim 2 wherein the collecting recess is a channel having a base which is inclined downwardly from the interior towards the exterior of the frame.	
	5. A frame according to any one of the preceding claims wherein, on formation of the said one piece moulding or extrusion, the said groove is a continuous groove extending around the interior of the frame, which groove has an upper face provided by a flange terminating at a free end thereof at the open end of the groove.	75
	6. A frame according to claim 1, substantially as herein described with reference to any one of the Figures 1, 10 and 11 of the accompanying drawings.	80
	7. A method of fixing a skylight on a roof which includes the steps of moulding or extruding a frame of machinable material having an interior to be covered by the skylight and an exterior, which frame has a profiled portion providing the upper surface of the frame, which profiled portion has a continuous, inwardly open groove extending around the interior of the frame, which groove has an upper face provided by a flange terminating at a free end thereof at the open end of the groove, a lower face provided by a ledge for supporting a skylight sheet and a base of the groove provided by the ledge a collecting recess adjacent to the said inwardly open end of the groove for the said inwardly open end of the groove for collecting water caused by condensation and orifices communicating with the recess and extending to the exterior of the frame for discharging water from the collecting recess to the exterior of the frame,	85
	machining the machinable material of the profiled portion of the frame to remove at least a part of the flange and so expose at least a part of the ledge therebeneath for receiving a skylight sheet thereon,	90
	securing the frame to the roof,	95
	placing a rim of the skylight sheet on the said ledge to support the skylight sheet thereon and cover the interior of the frame, and	100
	securing the rim of the skylight sheet to the ledge to fix the skylight sheet on the roof.	105
	8. A method according to claim 7, wherein,	110
	a four-sided said frame is formed,	
	the machinable material of the profiled portion of one side of the frame is machined to remove the flange and the upstanding rib from the said one side of the frame and so simultaneously expose the ledge at the said	115
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- one side and open the said groove at a longitudinal end of each of opposite sides of the frame, and
5. the rim of a four-sided skylight sheet is placed on the ledge by introducing opposite sides of the rim into the said open groove at respective said opposite sides of the frame and sliding the skylight sheet along the groove until the interior of the frame is covered by the skylight sheet.
10. A method according to claim 7, wherein the machinable material of the profiled portion of the frame is machined to remove the entire flange from the frame and so expose the ledge therebeneath, and
15. the rim of the skylight sheet is rested on the ledge so as to be surrounded by the upstanding rib of the frame, which method includes the further step of
20. securing a batten to the upstanding rib so that the batten overlies at least a part of the rim of the skylight sheet to retain the skylight sheet in position on the roof.
10. A method according to claim 7, wherein the machinable material of the profiled portion of the frame is machined to remove the entire flange and upstanding rib from the frame and so expose the ledge therebeneath, and the rim of the skylight sheet is rested on the ledge,
25. which method includes the further step of securing a batten having an upstanding rib element to the ledge so that the batten overlies at least a part of the rim of the skylight sheet and the rib element surrounds the rim of the skylight sheet.
30. 11. A method according to claim 7 substantially as herein described with reference to any one of Figures 2, 3, 5, 8 and 9 of the accompanying drawings.
35. 40.

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Sheet 1

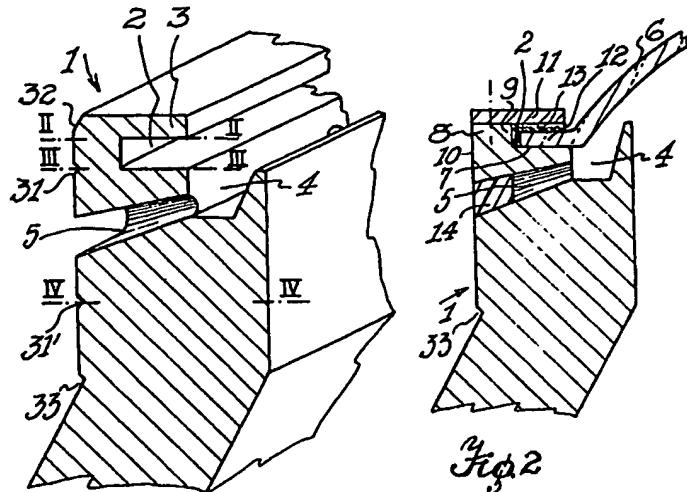


Fig.1

Fig.2

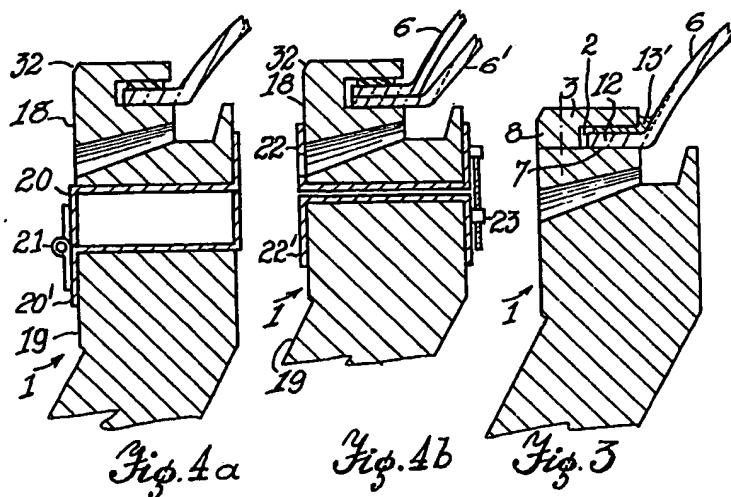


Fig.4a

Fig.4b

Fig.3

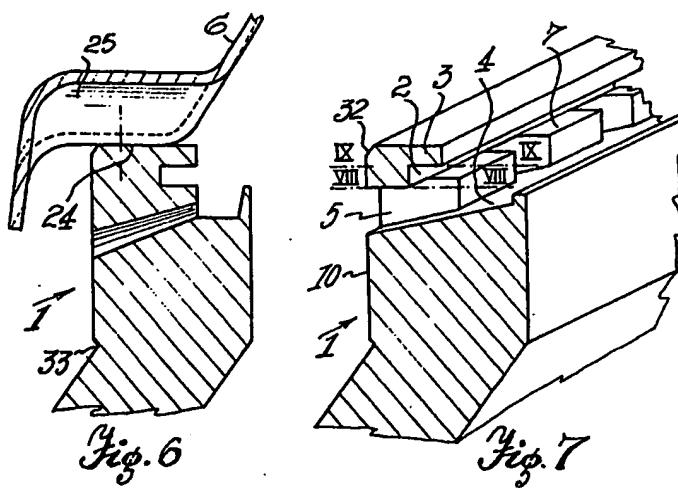
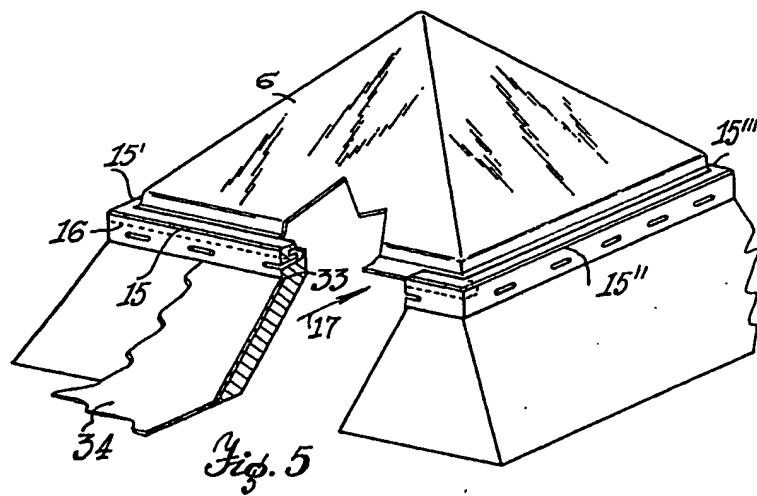
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Sheet 2



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Sheet 3

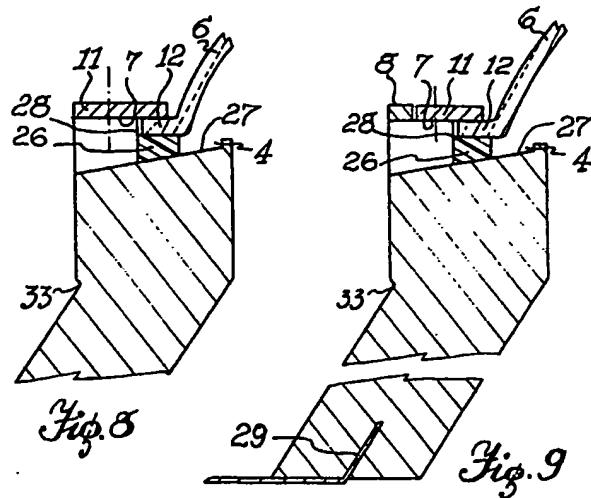


Fig. 8

Fig. 9

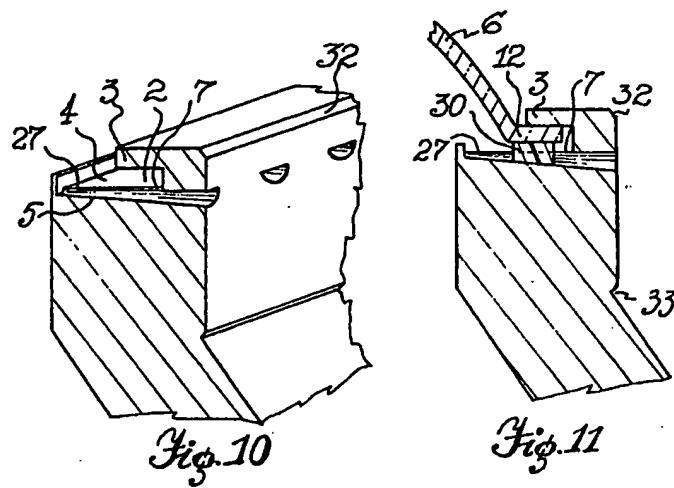


Fig. 10

Fig. 11